Patent Claims

1. A method of preventing or minimizing dye redeposition onto textile fabrics by contacting the dyed fabric comprising cotton fibers with is a dye redeposition inhibitor during the dye removal process, **characterized in that** the dye redeposition inhibitor is a polyester, which is produceable by reacting at least the following monomers:

(A) one or more dicarboxylic acid compound(s),

(B) one or more diol compound(s) having from 2 to 6 carbon atoms, and

(C) polyetherols with one or two hydroxy groups having at least 6 oxygen atoms,

wherein the monomers (A), (B), and (C) result in more than 80 wt.% of the incorporated monomers.

2. The method according to claim 1, **characterized in that** the polyetherols (C) have average molecular weights from 500 to 10,000 g/mole, especially from 1,000 to 8,000 g/mole.

3. A method according to any one of the preceding claims, **characterized in that** the polyesters is furthermore produceable by using

(D) one or more polyol compound(s) with at least 3 OH groups having from 3 to 12 carbon atoms, especially glycerol.

4. The method according to claim 1, **characterized in that** the polyesters is produceable by reacting at least

(A) 20 to 50 mole% of one or more dicarboxylic acid compound(s),

(B) more than 0 to 30 mole% of one or more diol compound(s) having from 2 to 6 carbon atoms,

(C) 10.1 to 50 mole% of one or more water-dilutable polyetherol(s), which can be produced by the addition of one or more C_2- to C_4-alkylene oxide(s) to a C_1 to C_{18} alcohol, especially a C_1 to C_6 alcohol, with one hydroxy group, wherein the alkylene oxide/alcohol mole ratio is in the range from 4 to 100 : 1, and

(D) 10.1 to 29.9 mole % of one or more polyol compound(s) having at least 3 OH groups.

5. The method according to claim 4, **characterized in that** 1 to 10 mole% of the diol compound (B) is incorporated.

6. A method according to any one of claims 4 or 5, **characterized in that** the average molecular weight of the polyester is less 5,000 g/mole, preferably from 2,000 to 5,000 g/mole.

7. A method according to any one of the preceding claims, **characterized in that** the dicarboxylic acid compounds (A) comprise terephthalic acid, isophthalic acid, and phthalic acid and their derivatives, especially terephthalic acid and its derivatives, preferably in a quantity of greater 90 mole% of terephthalic acid and its derivatives, based on the incorporated dicarboxylic acid compounds.

8. A method according to any one of the preceding claims, **characterized in that** independently of one another

(a) no tricarboxylic acid compounds and

(b) less than 10 wt.% of isophthalic acid or its derivatives, and especially no isophthalic acid or its derivatives

are employed.

9. A method according to any one of the preceding claims, **characterized in that** the diol compound (B) is ethylene glycol and/or propylene glycol.

10. A method according to any one of the preceding claims, **characterized in that** the polyester is anionically modified by incorporation of anionic monomers and/or is capped with terminal groups.

11. A method according to any one of the preceding claims,
characterized in that the polyester is produceable by reacting at least

(A) terephthalic acid, wherein the terephthalic acid comes to more than 90 mole% of the dicarboxylic acid compounds employed,

(B) ethylene glycol, wherein the ethylene glycol comes to more than 90 mole% of the diol compounds employed, and

(C) polyethylene glycol having a molecular weight from 2,000 to 8,000 g/mole, wherein polyethylene glycol having a molecular weight from 2,000 to 8,000 g/mole comes to more than 90 wt.% of the polyetherols employed.

12. A method according to any one of the preceding claims, **characterized in that** the polyetherols (C) are alkylene oxide addition products of ethylene oxide, propylene oxide, butylene oxide or their mixtures to aliphatic C_1 to C_{18} alcohols, preferably C_1 to C_6 alcohols, and/or water to water or methanol.

13. The method according to claim 1, **characterized in that** the polyesters are composed according to the formula

$$X\text{-}(OCH_2\text{-}CH_2)_n\text{-}[\text{-}(OOC\text{-}R^1\text{-}COO\text{-}R^2)_u\text{-}]\text{-}OOC\text{-}R^1\text{-}COO\text{-}(CH_2\text{-}CH_2O)_n\text{-}X\ ,$$

wherein each $\mathbf{R^1}$ residue is a 1,4-phenylene residue, optionally substituted for mono- or di-C_1-C_3-alkyl; the $\mathbf{R^2}$ residues are principally ethylene residues, 1,2-propylene residues, or mixtures thereof; each **X** represents independently of one another hydrogen, a C_1 to C_{12} hydrocarbon residue, especially ethyl or methyl; each **n** is a number from 7 to 115, and **u** is a number from 3 to 10.

14. A method according to any one of claims 5 to 13, **characterized in that** the polyester or polyester blend is liquid at room temperature.

15. The method according to claim 1, **characterized in that** the average polyesters are composed according to the empirical formula

$$(CAP)_X\ (T)_Z\ (I)_q\ (D)_r\ (P)_S\ (En)_t\ (A)_y\ (EG/PG)_v\ ,$$

wherein

(CAP) represents terminal groups capping the polymer at its end and

a) sulfoaroyl groups,

b) groups of the formula $MO_3\text{-}S\text{-}(O)_u\text{-}(CH_2)_p\text{-}(RO)_w\text{-}$, wherein **M** represents a metal ion, ammonium ion, or substituted ammonium ion, **R** means ethylene or mixtures of ethylene and propylene, **u** is 0 or 1, **p** is 0 or 1, and **w** represents an integer from 1 to 100,

c) poly(oxyethylene)monoalkyl ether groups, wherein the alkyl group has from 1 to 24 carbon atoms and the polyoxyethylene group is comprised of 2 to 200 oxyethylene units,

d) acyl- and aroyl groups having from 4 to 40 carbon atoms,

e) hydroxyacyl- and hydroxyaroyl groups having from 2 to 25 carbon atoms,

f) poly(oxyalkylene)monoalkyl phenol ether, wherein the alkyl group has from 6 to 18 carbon atoms and the polyoxyalkylene group is comprised of 0 to 80 oxyalkylene units

g) and mixtures thereof, and x represents a number from 0 to 2,

(T) is an arylene dicarbonyl group and z represents a number from 1 to 50,

(I) is an internal anionic group and q represents a number from 0 to 30,

(D) is an acetal group and r represents a number from greater 0 to 80,

(P) means polyol groups having at least 3 –OH groups, s is a number from 0 to 80, wherein the polyol quantity is less than 30 mole%, related to the total monomer units,

(En) is a poly(oxyalkylene)oxy group composed of 2 to 100 oxyalkylene groups, wherein t is a number from 0 to 25, and the alkylene groups have from 2 to 6 carbon atoms,

(A) is a 1,n-alkylene dicarbonyl group composed of 2 to 24 carbon atoms, and y represents a number from 0 to 15,

(EG/PG) is an oxyethylene oxy- or oxypropylene oxy group or mixtures thereof, and v represents a number from 0 to 80, and

wherein the polyesters have molecular weights from 500 to 100,000 g/mole, preferably from 1,000 to 20,000 g/mole.

16. The method according to claim 15, **characterized in that** (I) represents the sodium salt of the 5-sulfoisophthaloyl group.

17. A method according to any one of claims 15 or 16, **characterized in that** (CAP) represents the sodium salt of the 5-sulfoisophthaloyl group.

18. A method according to any one of claims 15 to 17,
characterized in that the acetal group (D) is independently of one another:

- the reaction product of a formyl ester with glycerol,
- the reaction product of a dialdehyde with 2 moles of glycerol, and/or
- the reaction product of a tetraalkoxy propane with 2 moles of glycerol.

19. A method according to any one of claims 15 to 18,
characterized in that q, x, and y are 0.

20. A method according to any one of the preceding claims, **characterized in that** for the removal of dye abrasive stones and/or enzymes, especially at least cellulases, are put into contact with the fabric in order to achieve a stonewashed look.

21. A method according to any one of the preceding claims, **characterized in that** the dye redeposition inhibitor is put into contact with the fabric both during the stonewashing step and the preceding desizing step.

22. A method according to any one of the preceding claims, **characterized in that** the dye part of which needs to be removed is indigo.

23. A method according to any one of the preceding claims, **characterized in that** the polyetherols (C) have from 16 to 180 C_2 to C_4 alkylene oxide units.

24. A method according to any one of claims 1, 2, and/or 5 to 23, **characterized in that** the polyester is not made utilizing polyols having at least 3 OH groups.

25. A method according to any one of the preceding claims, **characterized in that** the polyesters have molecular weights of less than 5,000 g/mole.

26. Use of the polyester defined by any one of claims 1 to 19, 23, 24, and/or 25 for preventing or minimizing dye redeposition onto textile fabric during stonewashing or biostoning of indigo-dyed cotton fabrics.

27. Indigo-dyed cotton fabric, **characterized in that** the indigo-dyed cotton fabric is produced in the presence of a polyester during a stonewashing or biostoning process in order to prevent dye redeposition and the polyester is defined by any one of claims 1 to 19, 23, 24, and/or 25.
